U.S. DEPARTMENT OF ENERGY
SOLAR DECATHLON
2011

Efficient Home Projects for All Budgets

How to Get Started

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What we'll cover

- Why energy efficiency
- Step 1: Know how much you spend
- Step 2: Get started saving energy and money

Cost and Effort

- *Basic* – No cost and low effort
- *Intermediate* – Low to medium cost and effort
- *Advanced* – Medium to high cost and effort. May need a professional.

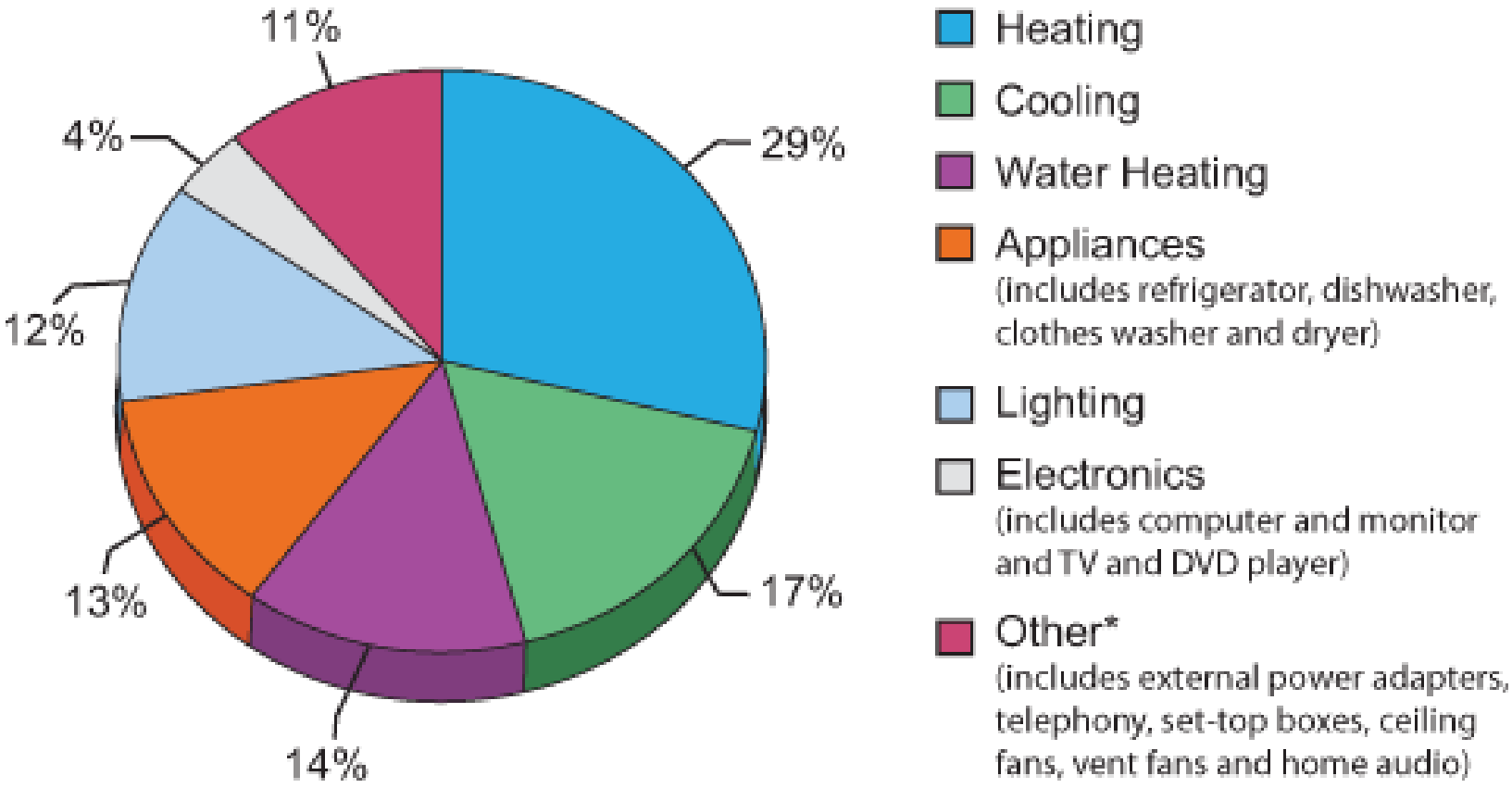
Why should I care about energy efficiency?

- Save money on your utility bills
  - Making energy efficient improvements can save 10-30% on bills
- Increase your home's comfort
  - Energy efficient improvements help keep your home's temperature steady
- Increase your home's value
  - Many homebuyers are looking for houses that have energy and water efficient features
- Reduce demands on the power grid
  - Many utility companies offer incentives to homeowners to reduce their energy consumption
- Lower your carbon footprint
  - Did you know a home has a bigger carbon footprint than 2 cars?

Step 1: Know how much you spend

Know how much you spend . . . The Pie

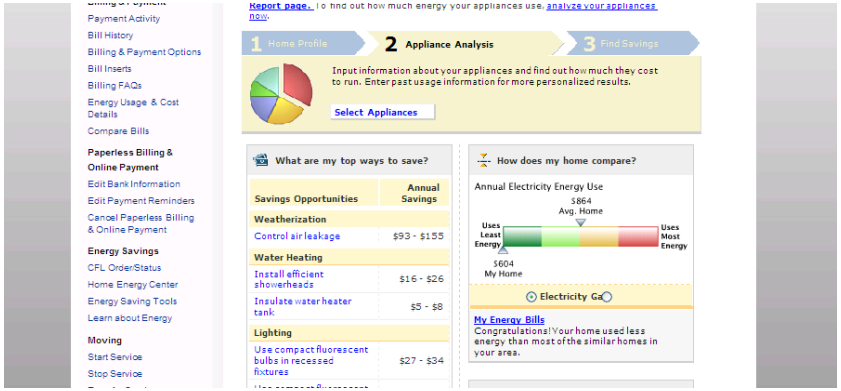
Annual Energy Bill for a typical Single Family Home is approximately $2,200.



Source: EPA ENERGY STAR® & Typical House Memo, Lawrence Berkeley National Laboratory, 2009 and Typical house_2009_Reference.xls. Average price of electricity is 11.3 cents per kilo-watt hour. Average price of natural gas is $13.29 per million Btu.

Monitoring and Measuring Your Use

- Find your utility bill . . . . And learn how to read it - *Basic*



- Use energy monitoring and energy measurement devices – *Intermediate to Advanced*
  - Monitor a specific device
  - Monitor whole home

DIY Home Audit - *Basic*

- Keep a checklist of areas you have inspected & problems you find
- Make a list of obvious air leaks (drafts you can feel or see)
- Look for gaps around pipes and wires, electrical outlets, foundation seals, and mail slots
- Inspect windows and doors for air leaks
- Measure the insulation in your attic with a ruler or yard stick
  - Also check if your attic door is insulated
  - Check the insulation on your water heater and pipes
- Check your appliances for the ENERGY STAR® label
  - Take note of the age of your appliances
- Check your lights taking note of the type of bulb in them

Professional Home Audit - *Advanced*

- You may want a professional home energy audit if you are considering a substantial home retrofit
- Professional Home Audits usually include
  - Blower door test - measures the extent of leaks in the building envelope
  - Infrared cameras - reveal hard-to-detect areas of air infiltration and missing insulation.
- Finding a professional
  - Check with your local utility company
  - Check referrals
  - Check Better Business Bureau

Step 2: Get started saving

Heating & Cooling

Heating & Cooling - *Basic*

- Use your programmable thermostat
  - Can save about $180 a year when programmed properly*
  - Automatically reduce heating and cooling in your home when you don't need as much
  - What to do: follow product instructions or visit www.ENERGYSTAR.gov to learn how to program properly

Programmable Thermostat Setpoint Times & Temps			
Setting	Time	Setpoint Temperature (Heat)	Setpoint Temperature (Cool)
Wake	6:00 a.m.	≤ 70° F	≥ 78° F
Day	8:00 a.m.	Setback at least 8° F	Setup at least 7° F
Evening	6:00 p.m.	≤ 70° F	≥ 78° F
Sleep	10:00 p.m.	Setback at least 8° F	Setup at least 4° F

* EPA ENERGY STAR®

Heating & Cooling - *Basic*

- Keep your registers clear
  - Clean air registers, baseboard heaters, and radiators as needed
  - Make sure registers are not blocked by furniture, carpeting, or drapes.

- Use your drapes to help regulate inside temperatures
  - On sunny winter days, open blinds, shades and curtains, especially if your windows face south, to help keep you warm. At night, close the blinds, shades and curtains to help keep heat inside.
  - In the summer, keep blinds, shades and curtains closed to avoid heat gain from the sun shining in.

Heating & Cooling - *Intermediate*

- Change your air filters.
  - Check your filter every month, especially during heavy use months (winter and summer). If the filter looks dirty after a month, change it.
  - At a minimum, change the filter every 3 months.
- Install a programmable thermostat.
  - This can be a DIY project.
- Install an ENERGY STAR qualified ceiling fan.
  - In the winter, switch your fan to rotate clockwise to force warm air near the ceiling down into the living space.
  - In the summer, rotate counter-clockwise. On hotter days, dialing up the thermostat by only two degrees and using your ceiling fan can lower air conditioning costs by up to 14% over the course of the cooling season.*

* EPA ENERGY STAR®

Heating & Cooling - *Intermediate*

- Find and seal air leaks
  - Use a leak detector or feel around windows and doors to find leaks
  - Caulk and weather strip leaky doors and windows
  - In the basement, make sure all ductwork is connected
  - Caulk and seal air leaks where plumbing, ducting, or electrical wiring penetrates through walls
  - Install foam gaskets behind outlet and switch plates on walls
- Add window film
  - Adding window film can help reduce solar heat gain

Heating & Cooling - *Advanced*

- Properly sealing and insulating your home can save up to 20% of heating/cooling costs*
  - Seal air leaks throughout the home to stop drafts
  - Add insulation to block heat loss in winter and heat gain in summer
  - Choose ENERGY STAR qualified windows when replacing windows

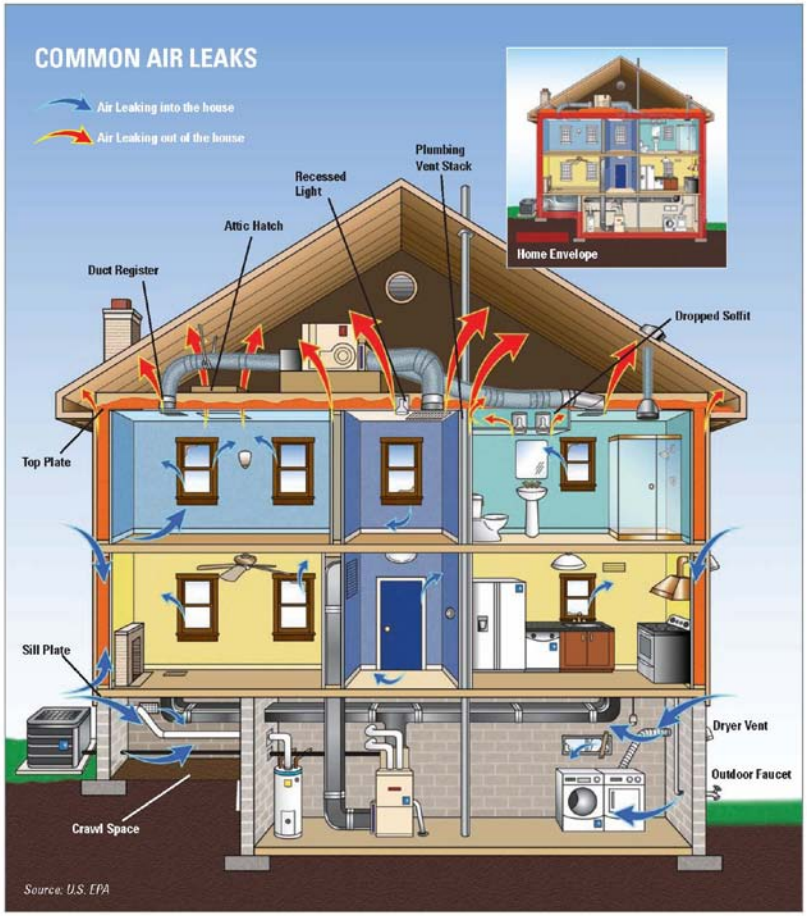



- If you are skilled in home improvement, this can be DIY
  - Check out ENERGY STAR's DIY Guide to Sealing & Insulating at www.energystar.gov
- Installers or professionals are recommended for most homeowners

* EPA ENERGY STAR®

Heating & Cooling - *Advanced*

- Know where to insulate
  - Attic spaces
  - Ducts
  - Ceilings
  - Walls
  - Floors above unheated garage
  - Basement
  - Crawl spaces
- Know where to seal
  - Windows, doors
  - Pipes, wires etc. through home envelope
  - Recessed lighting
  - Electrical outlets



Heating & Cooling - *Advanced*

- You might need more insulation if . . .
  - You have an older home and haven't added insulation. Only 20% of homes built before 1980 are well insulated.*
  - You are uncomfortably cold in the winter or hot in the summer.
  - You build a new home, addition, or install new siding or roofing.
  - You pay high energy bills.
  - You are bothered by noise from outside.
- Know how what r-value and much you need
  - Insulation is measured in R-values—the higher the R-value, the better your walls and roof will resist the transfer of heat.
  - Typically 15 – 19 inches of insulation is recommended for most climates.
  - Visit www.energysavers.gov for more on R-values.

* Department of Energy

Step 2: Get started saving

Water Heating

Water Heating - *Basics*

- Lower the thermostat on your water heater to 120°F.
  - Setting it too high can waste anywhere from $36 to $61 annually in standby heat losses and more than $400 in demand losses.*
  - Turn the temp down more when away on vacation.
- Don't waste water. Wasting water makes your water heater work harder to heat more water.
  - Turn off the tap while brushing your teeth
  - Take shorter showers.
  - Repair leaky faucets.
- Drain a quart of water from your water tank every 3 months to remove sediment that lowers the efficiency of your heater.
  - Follow the manufacturer's instructions.

* EPA ENERGY STAR®

Water Heating - *Intermediate*

- If you have an older water heater, wrap it with an insulating jacket and save more than $30 per year in excess heat loss.*
- Insulate the first 6 feet of the hot and cold water pipes connected to the water heater.
  - Helps keep your hot water from cooling off before it gets to the tap.
- Install EPA WaterSense® qualified bathroom faucets and showerheads.
  - WaterSense products use less water without sacrificing performance.

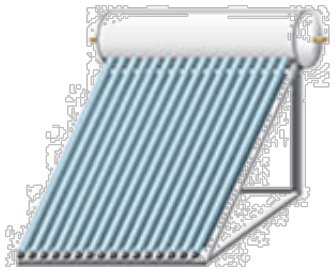
* EPA ENERGY STAR®

Water Heating - *Advanced*

- Install a new, energy efficient water heater
  - Look for an ENERGY STAR qualified water heater
  - There are many varieties to choose from
    - Gas Condensing – can save over $100/yr*
    - Heat Pump – can save almost $300/yr*
    - High Efficiency Gas Storage – can save more than $30/yr*
    - Solar – can cut annual water heating costs in half*
    - Whole Home Gas Tankless – can save more than $100/yr*

LEARN MORE AT energystar.gov

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Step 2: Get started saving

Appliances

Appliances - *Basic*

- Wash only full loads of laundry.
- Wash clothes in cold water.
- Do not over-dry clothes.
- Clean the lint trap before each dryer load.
- Vacuum under/behind your refrigerator.
- Set your refrigerator to 38°F to 40°F and freezers at 0°F.
- Wash only full loads in your dishwasher.
- Use the air dry or energy saver option in your dishwasher.
- Match the size of the pot to the size of the burner on your stove.

Appliances - *Advanced*

- When replacing older appliances, look for ENERGY STAR
  - ENERGY STAR qualified appliances incorporate advanced technologies that use 10-50% less energy and water than standard models.
  - Dishwashers - can save you about $60 over its lifetime*
  - Clothes Washers – can save about $750 over its lifetime*
  - Refrigerators – can save up to $165 over its lifetime vs. non-qualified.*
- A new ENERGY STAR Most Efficient 2011 designation recognizes the most efficient products among those that qualify for the ENERGY STAR.

- Select appliances that are the right size for your family, household, and needs.

* EPA ENERGY STAR®

Step 2: Get started saving

Lighting

Lighting - *Basic*

- Turn off lights when leaving a room.
- Only use the amount of light needed for the task.
- Place lamps in corners so they reflect off two walls.
- Use lighter/brighter colored lamp shades.
- Use a mirror to reflect the light and help illuminate the space.

Lighting - *Intermediate*

- Use compact fluorescent light bulbs (CFLs)
  - Replacing your five most frequently used light fixtures or the bulbs in them with ENERGY STAR qualified lights can save $70 a year in energy costs.*

- Use LED bulbs
  - ENERGY STAR-qualified LEDs use only 20% – 25% of the energy and last up to 25 times longer than the traditional incandescent bulbs*

- Install solar landscape lights to light up your front path.
- Install light dimmers, timers, or motion sensors.

* EPA ENERGY STAR®

Lighting - *Advanced*

- Install ENERGY STAR qualified light fixtures
  - Use 1/4 the energy of traditional lighting
  - Save money on energy bills and bulb replacements; light lasts between 10,000 – 50,000 hours (about seven - twenty two years of regular use)*
  - Distribute light more efficiently and evenly than standard fixtures
  - Come in hundreds of decorative styles including portable fixtures — such as table, desk and floor lamps — and hard-wired options such as front porch, dining room, kitchen ceiling and under-cabinet, hallway ceiling and wall, bathroom vanity fixtures, and more

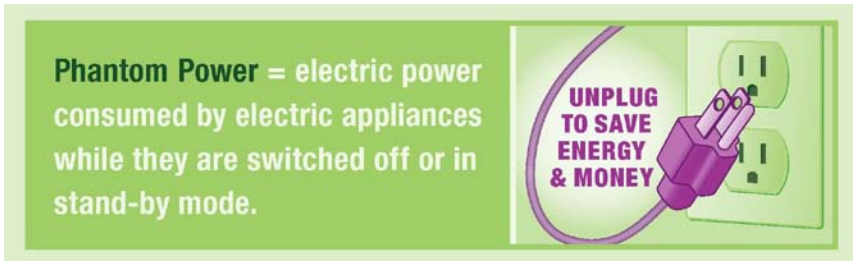
* EPA ENERGY STAR®

Step 2: Get started saving

Electronics

Electronics - *Basic*

- Indentify & eliminate energy vampires
  - Energy vampires are devices that draw phantom power even when turned off
  - The average U.S. household spends $100/year to power devices while they are off (or in standby mode)*
  - Examples: cell phone chargers, laptops, cable TV boxes
  - What to do: unplug device or use a power strip to turn off



* EPA ENERGY STAR®

Electronics - *Advanced*

- Look for the ENERGY STAR logo when purchasing
  - Audio/Video equipment – DVD players, Blu-ray, shelf audio systems etc.
  - Battery chargers – Power tools, electric shavers etc.
  - Computers
  - Cordless phones
  - Displays – computer monitors, digital picture frames
  - Imaging equipment – copiers, fax machines, printers, scanners, etc.
  - Set-top boxes & cable boxes
  - TVs




Step 2: Get started saving

Renewable Energy

Renewable Energy - *Advanced*

- Install renewable energy devices
  - Solar
    - Create energy to offset bill costs, or whole home to sell back to the grid
    - There is a Federal tax credit for solar & many states have additional incentives
    - Some products are DIY for the skilled home improver
    - Solar lease program may be available
  - Small wind
    - There are different sized wind turbines depending on need
      - Urban: can be mounted to the side of a building
      - Rural: need an acre or more

Tips and Resources

DIY vs. Professional

- Research the project before you start
  - How-to
  - Materials list
  - Skills needed
- Be sure to wear proper safety equipment and take proper precautions
  - Face mask
  - Safety goggles
  - Gloves
  - Well ventilated area
- If you need professional help
  - Check with your local hardware store
  - Ask friends for referrals

Resources

- Department of Energy: www.energy.gov
  - Energy Efficiency & Renewable Energy: www.eere.energy.gov
  - Energy Savers: www.energysavers.gov
- Environmental Protection Agency: www.epa.gov
  - ENERGY STAR: www.energystar.gov
  - WaterSense: www.epa.gov/watersense
- Your local Utility Company
- Your local Home Improvement Retailer

Questions?

Thank you!